Comparison of Environmental Factors Between West Nile Virus Case and Control Areas in the Greater Phoenix Area, 2004

AKA "Windshield Survey"

Bill Frank
ADHS Vector-Borne and Zoonotic Disease Program
Epidemiologist

Arizona Department of Health Services

Additional Authors

- Craig Levy, ADHS/VBZD
- Christine Wampler, ADHS/VBZD
- T. Michael Fink, ADHS/VBZD
- Elisabeth Lawaczeck, ADHS
- Laura Kroger, ADHS/HIV
- Richard Porter, ADHS

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Why an environmental study?

The 2004 Arizona WNV Outbreak posed many questions, one of the more interesting ones being, “Why did some areas of The Valley experience clusters of cases while comparable areas had no cases at all?” Were there environmental factors which might account for the differences in the numbers of cases?

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WNV Background

- 1937: 1st identified (in Africa)
- 1999: Introduced to USA (New York City)
- 2003: 1st WNV cases in Arizona (15)
- 2004: Outbreak in Arizona peaked (391)
- 2005: Arizona human WNV cases at 112
- Nationwide (1999-2005), there have been 19,543 diagnosed human cases with 761 deaths

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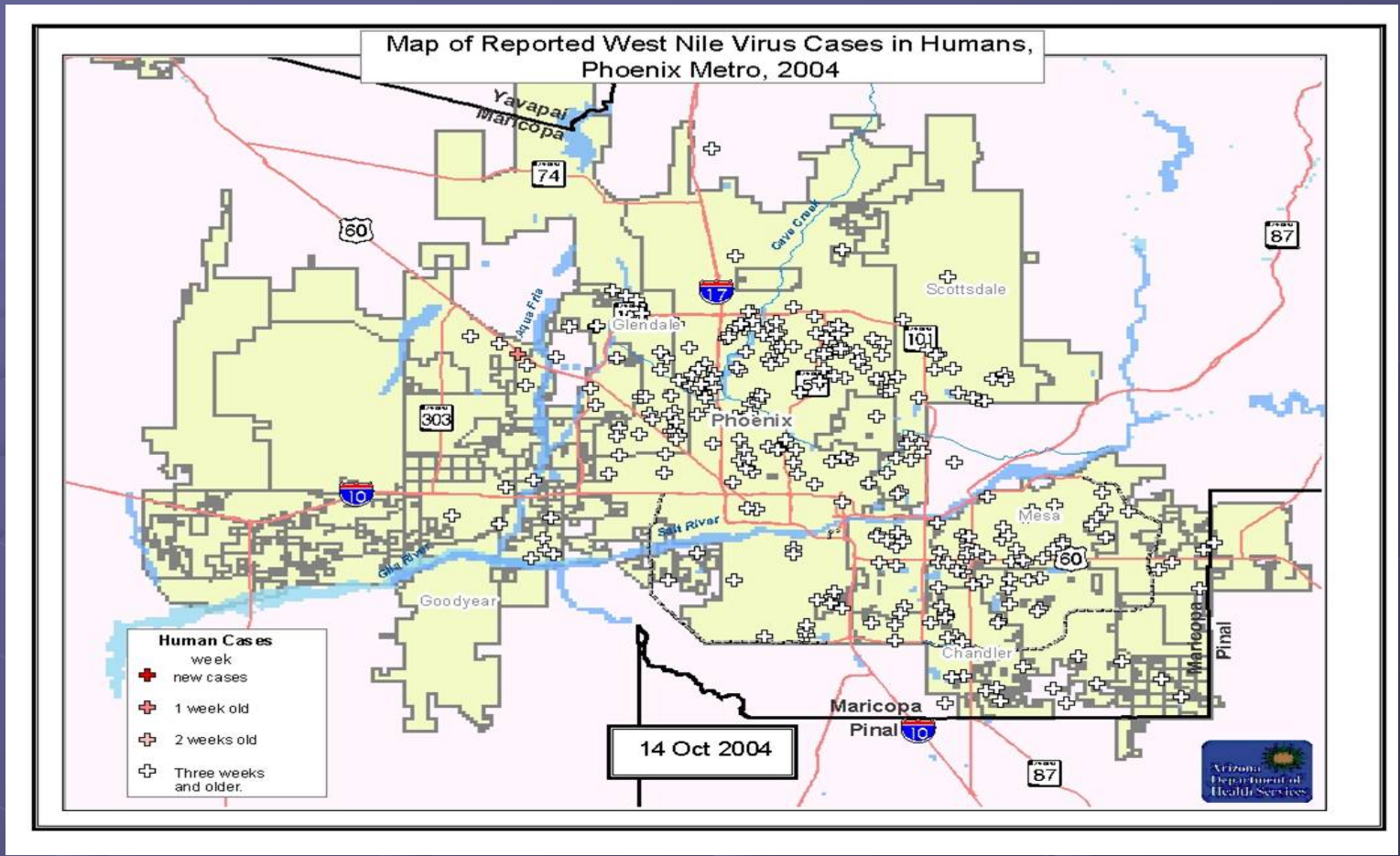
Human WNV cases in Maricopa County, AZ, 2004



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What Locations to Study?

- **5 high-case count* zip codes selected**
- **7-11 case residences in each zip code**

- **5 zero-case count zip codes selected**
- **7-11randomly selected control residences in each zip code**

- **Net for study: 40 case houses/45 controls**

*7 or more cases

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What variables to study?

*Location info *Date

*Case v. control area

*Age and type of construction *Presence of porches

*Presence of clutter, bird baths, dog bowls, flower pots, etc.

*Landscaping 1: Composition of ground cover

*Landscaping 2: Type and number of trees

*Landscaping 3: Percent canopy coverage

*Landscaping 4: Shrubs

*Critters: Presence/type of birds seen *Horses or livestock

*Proximity to washes, greenbelts, waterways, industrial/agric zones

*Is area flood irrigated?

*Swimming pools? Present/Absent and maintenance

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We saw a variety of landscaping

From no vegetation whatsoever…

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To lushly tropical…

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And everything in between.

Results:

% Canopy Cover:	High Case Area	Control Area	Probability
<25%	17	20	0.011*
>25%	20	12	
Age of Construction:	**High Case Area**	**Control Area**	**Probability**
<1990	33	28	0.008*
1991-2004	4	16	
Ground Cover:	**High Case Area**	**Control Area**	**Probability**
Lawn	18	15	0.054
No Lawn	14	29	

*Statistically significant at the 95% level or greater

More Results:

Presence of Birds:	High Case Area	Control Area	Probability
Yes	17	23	0.427
No	23	22	
Near Greenbelt:	**High Case Area**	**Control Area**	**Probability**
Yes	30	30	0.861
No	10	12	
Swimming Pool:	**High Case Area**	**Control Area**	**Probability**
Yes	9	7	0.376
No	29	37	

*Statistically significant at the 95% level or greater

Conclusions

Our results suggest that features of mature, non-water conserving neighborhoods may be contributing factors to the breeding and harborage of WNV-carrying mosquitoes and increased incidence of human WNV infection.

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